

RESEARCH ON THE INFLUENCE OF THE CUTTING CONDITIONS ON THE HOLES QUALITY OF ARMOR CERAMIC TILES IN ROTARY ULTRASONIC MACHINING

Abstract

Rotary ultrasonic machining (RUM) is regarded as one of the cost-effective machining methods for Armor ceramic tiles material. It is a hybrid machining process that combines the material removal mechanisms of diamond grinding and ultrasonic machining (USM). Chippings at the holes exit are also observed under a microscope. A number of factors influence the quality of the cut surface: For spindle speed, feed-rate, and ultrasonic power. Furthermore, the paper presents the results of a designed experimental investigation into RUM of ACT. A three-variable two-level full factorial design is employed to reveal main effects as well as interaction effects of three RUM process parameters (spindle speed, feed-rate, and ultrasonic power). The process outputs studied include holes exit section surface roughness, material removal rate (MRR), and holes quality (in terms of Entrance section chipping dimensions).

Keywords: Rotary ultrasonic machining (RUM)、Armor ceramic tiles (ACT)、Material removal rate (MRR)